

Claims

What is claimed:

- 1 1. A method for scheduling information in a multiple antenna wireless cellular
 2 network, the wireless cellular network comprising a base transceiver station and a plurality
 3 of subscriber units wherein each of the plurality of subscriber units belongs to a service
 4 class, the method comprising:
 5 receiving a service flow request from a subscriber unit;
 6 determining the service class of the subscriber unit; and
 7 scheduling time slots and frequency blocks for the service flow request based on
 8 the service class of the subscriber unit.
- 1 2. The method of claim 1 wherein the service class comprises a priority ranking.
- 1 3. The method of claim 2 wherein scheduling time slots and frequency blocks for the
 2 service flow request based on the service class of the subscriber unit further comprises:
 3 scheduling time slots and frequency blocks for the service flow request based on
 4 the service class and the priority ranking of the subscriber unit.
- 1 4. The method of claim 2 wherein the service class comprises more than one service
 2 class and scheduling time slots and frequency blocks for the service flow request based on
 3 the service class of the subscriber unit further comprises:
 4 utilizing a different algorithm to schedule the time slots and frequency blocks for
 5 each service class.

1 5. The method of claim 4 further comprising:
2 utilizing a first algorithm to schedule time slots and frequency blocks for a first
3 service class.

1 6. The method of claim 5 further wherein utilizing the first algorithm to schedule
2 time slots and frequency blocks for the first service class comprises:
3 creating a node tree; and
4 implementing the first algorithm via the node tree.

1 7. The method of claim 6 wherein the first service class comprises subscriber units
2 requiring a guaranteed real-time data rate.

1 8. The method of claim 5 further comprising:
2 utilizing a second algorithm to schedule time slots and frequency blocks for a
3 second service class.

1 9. The method of claim 8 wherein utilizing the second algorithm to schedule time
2 slots and frequency blocks for the second service class comprises:
3 1) scheduling time slots and frequency blocks for the service flow request of a
4 subscriber unit of a particular priority of the second service class based on a block weight
5 of the service flow request;
6 2) determining whether the number of scheduled time slots and frequency
7 blocks equals the block weight of the service flow request;

3) adjusting the block weight of the service flow request if the number of scheduled time slots and frequency blocks does not equal the block weight of the service flow request;

4) repeating steps 1-3 for a subsequent service flow request of a subscriber unit of the particular priority of the second service class.

10. The method of claim 9 wherein adjusting the block weight of the service flow request comprises increasing the block weight if the number of scheduled time slots and frequency blocks is less than the block weight and decreasing the block weight if the number of scheduled time slots and frequency blocks is more than the block weight.

11. The method of claim 10 wherein the second service class comprises subscriber units requiring a best effort data rate.

12. The method of claim 11 wherein subscriber units in the second service class transmit data based on a predetermined transmission threshold.

13. A system for scheduling information in a multiple antenna wireless cellular network, the wireless cellular network comprising a base transceiver station and a plurality of subscriber units wherein each of the plurality of subscriber units belongs to a service class, the system comprising:

- means for receiving a service flow request from a subscriber unit;
- means for determining the service class of the subscriber unit; and
- means for scheduling time slots and frequency blocks for the service flow request based on the service class of the subscriber unit.

14. The system of claim 13 wherein the service class comprises a priority ranking.

15. The system of claim 14 wherein the means for scheduling time slots and frequency blocks for the service flow request based on the service class of the subscriber unit further comprises:

- means for scheduling time slots and frequency blocks for the service flow request based on the service class and the priority ranking of the subscriber unit.

16. The system of claim 14 wherein the service class comprises more than one service class and the means for scheduling time slots and frequency blocks for the service flow request based on the service class of the subscriber unit further comprises:

- means for utilizing a different algorithm to schedule the time slots and frequency blocks for each service class.

1 17. The system of claim 15 further comprising:
 2 means for utilizing a first algorithm to schedule time slots and frequency blocks for
 3 a first service class.

1 18. The system of claim 17 wherein the means for utilizing the first algorithm to
 2 schedule time slots and frequency blocks for the first service class comprises:
 3 means for creating a node tree; and
 4 means for implementing the first algorithm via the node tree.

1 19. The system of claim 18 wherein the first service class comprises subscriber units
 2 requiring a guaranteed real-time data rate.

1 20. The system of claim 16 further comprising:
 2 means for utilizing a second algorithm to schedule time slots and frequency blocks
 3 for a second service class.

1 21. The system of claim 20 wherein the means for utilizing the second algorithm to
 2 schedule time slots and frequency blocks for the second service class comprises:
 3 means for scheduling time slots and frequency blocks for the service flow request
 4 of a subscriber unit of a particular priority of the second service class based on a block
 5 weight of the service flow request;
 6 means for determining whether the number of scheduled time slots and frequency
 7 blocks equals the block weight of the service flow request; and

8 means for adjusting the block weight of the service flow request if the number of
 9 scheduled time slots and frequency blocks does not equal the block weight of the service
 10 flow request.

1 22. The system of claim 21 wherein the means for adjusting the block weight of the
 2 service flow request comprises increasing the block weight if the number of scheduled
 3 time slots and frequency blocks is less than the block weight and decreasing the block
 4 weight if the number of scheduled time slots and frequency blocks is more than the block
 5 weight.

1 23. The system of claim 22 wherein the second service class comprises subscriber
 2 units requiring a best effort data rate.

1 24. The system of claim 23 wherein subscriber units in the second service class
 2 transmit data based on a predetermined transmission threshold.

1 25. A computer readable medium containing program instructions for scheduling
2 information in a multiple antenna wireless cellular network, the wireless cellular network
3 comprising a base transceiver station and a plurality of subscriber units wherein each of
4 the plurality of subscriber units belongs to a service class, the program instructions
5 comprising:

6 receiving a service flow request from a subscriber unit;

7 determining the service class of the subscriber unit; and

8 scheduling time slots and frequency blocks for the service flow request based on

9 the service class of the subscriber unit.

1 26. The computer readable medium of claim 25 wherein the service class comprises a
2 priority ranking.

1 27. The computer readable medium of claim 26 wherein scheduling time slots and
2 frequency blocks for the service flow request based on the service class of the subscriber
3 unit further comprises:

4 scheduling time slots and frequency blocks for the service flow request based on

5 the service class and the priority ranking of the subscriber unit.

1 28. The computer readable medium of claim 26 wherein the service class comprises
2 more than one service class and scheduling time slots and frequency blocks for the service
3 flow request based on the service class of the subscriber unit further comprises:

4 utilizing a different algorithm to schedule the time slots and frequency blocks for
5 each service class.

1 29. The computer readable medium of claim 28 further comprising:
2 utilizing a first algorithm to schedule time slots and frequency blocks for a first
3 service class.

1 30. The computer readable medium of claim 29 further wherein utilizing the first
2 algorithm to schedule time slots and frequency blocks for the first service class comprises:
3 creating a node tree; and
4 implementing the first algorithm via the node tree.

1 31. The computer readable medium of claim 30 wherein the first service class
2 comprises subscriber units requiring a guaranteed real-time data rate.

1 32. The computer readable medium of claim 28 further comprising:
2 utilizing a second algorithm to schedule time slots and frequency blocks for a
3 second service class.

1 33. The computer readable medium of claim 32 wherein utilizing the second algorithm
2 to schedule time slots and frequency blocks for the second service class comprises:

1) scheduling time slots and frequency blocks for the service flow request of a subscriber unit of a particular priority of the second service class based on a block weight of the service flow request;

2) determining whether the number of scheduled time slots and frequency blocks equals the block weight of the service flow request;

3) adjusting the block weight of the service flow request if the number of scheduled time slots and frequency blocks does not equal the block weight of the service flow request;

4) repeating steps 1-3 for a subsequent service flow request of a subscriber unit of the particular priority of the second service class.

34. The computer readable medium of claim 33 wherein adjusting the block weight of the service flow request comprises increasing the block weight if the number of scheduled time slots and frequency blocks is less than the block weight and decreasing the block weight if the number of scheduled time slots and frequency blocks is more than the block weight.

35. The computer readable medium of claim 34 wherein the second service class comprises subscriber units requiring a best effort data rate.

36. The computer readable medium of claim 35 wherein subscriber units in the second service class transmit data based on a predetermined transmission threshold.

37. A scheduler for scheduling information in a multiple antenna wireless cellular network, the wireless cellular network comprising a base transceiver station and a plurality of subscriber units wherein each of the plurality of subscriber units belongs to a service class, the scheduler comprising:

a buffer for receiving a service flow request from a subscriber unit; and

a processor for determining the service class of the subscriber unit and scheduling time slots and frequency blocks for the service flow request based on the service class of the subscriber unit.

38. The scheduler of claim 37 wherein the service class comprises a priority ranking.

39. The scheduler of claim 38 wherein the processor further comprises:
means for scheduling time slots and frequency blocks for the service flow request based on the service class and the priority ranking of the subscriber unit.

40. The scheduler of claim 39 wherein the service class comprises more than one service class and the processor further comprises:

means for utilizing a different algorithm to schedule the time slots and frequency blocks for each service class.

- 1 41. The scheduler of claim 40 wherein the processor further comprises:
- 2 means for utilizing a first algorithm to schedule time slots and frequency blocks for
- 3 a first service class; and
- 4 means for utilizing a second algorithm to schedule time slots and frequency blocks
- 5 for a second service class.